Contribution ID: **17** Type: **not specified**

Estimating the Rates of Stellar Mergers in the Milky Way from Astrophysical Transients

Monday 2 February 2026 15:20 (25 minutes)

Luminous Red Novae (LRNe) are astrophysical transients thought to arise from stellar mergers, offering an important insight into the final stages of binary evolution. To date, only four Galactic LRNe have been identified, with the most recent detected in 2008, making it difficult to constrain their intrinsic rate in the Milky Way. In this PhD project, I investigate how detections from current time-domain surveys can be used to estimate the Galactic stellar merger rate by simulating the detectability of LRNe. I develop an injection-and-recovery simulation framework in which synthetic LRNe light curves are generated using templates of known Galactic LRNe (V4332 Sgr, V838 Mon, and V1309 Sco) and placed at random locations throughout the Milky Way, assuming they trace the stellar mass distribution of the disk and bulge. These simulated events are scaled for distance and interstellar extinction using three-dimensional dust maps and are then sampled through the actual cadence and sensitivity of the Zwicky Transient Facility (ZTF). By quantifying the fraction of injected LRNe that would be recovered by ZTF, I determine the detection efficiency for different types of Galactic stellar mergers. I will discuss the main challenges of this approach and present current progress, including searches for candidate events in real-time alert streams.

Author: KATUSIIME, Grace (ICCUB)

Co-authors: BLAGORODNOVA MUJORTOVA, Nadejda (ICCUB); PORTELL I DE MORA, Jordi (ICCUB)

Presenter: KATUSIIME, Grace (ICCUB)